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## A DEVICE FOR COLLECTING WASTE

## FIELD OF THE INVENTION

The present invention relates to a device for collecting waste, the device comprising a receptacle in which a plastics bin liner bag is placed.

More particularly, the present invention relates to a device for collecting or packaging waste seeking to facilitate and simplify the operations of collecting and packaging waste whether for home or professional use, and more particularly seeking to improve comfort and hygiene of such use.

More precisely, the present invention relates to a device for collecting waste, which device comprises a receptacle in which a plastics bin liner bag is placed, and further comprises:

- a storage compartment for storing a covering in the form of a sheath or sock for forming a bag and made of a plastics film, said covering being contained in a storage compartment, preferably in folded form, said compartment being situated in the top portion of said receptacle, preferably inside it;

- drive means suitable for delivering said covering from said storage compartment inside of said receptacle to form said bag, preferably down to the bottom of said receptacle;

- seal and cutter means, preferably operating by heat-sealing and hot-cutting, for sealing and cutting said covering, enabling a said bag to be made from said covering leaving said compartment, and subsequently enabling a said bag to be closed and separated from the remainder of said covering once the bag has been filled with waste; and

- said storage compartment being disposed in such a manner as to define a top central orifice of said receptacle through which waste can be introduced into said bag.

## BACKGROUND OF THE INVENTION

US patent No. 6 065 272 describes a waste collector device of that type in which the drive means are rotary rollers placed against each other in the center region of the receptacle on a permanent basis. Said rollers press continuously against the plastics sheath delivered from the top storage compartment. When waste is dropped in from above the receptacle, said rollers move apart from each other to allow the waste to pass, but continue to exert pressure against the sheath and the waste, thereby causing both the sheath and the waste to be entrained together. The constant pressure from the rollers on the sheath enables the receptacle to be continuously confined. Entraining the waste into the inside of the receptacle is necessarily associated with sheath material being delivered from its storage compartment.

The device described in US patent No. 6 065 272 is more particularly intended for packaging items of waste in unitary manner after they have been driven and ground up individually, while also delivering a length of covering that is necessary and sufficient to constitute a unitary package.

That device is not suitable for use in applications where the waste being collected in the receptacle is unsuitable for being ground up or destroyed, in particular when the waste is malodorous, or when mechanical contact with the waste while it is being collected can lead to an increase nuisance level and can constitute a major drawback.

## OBJECTS AND SUMMARY OF THE INVENTION

The device of the invention thus enables a plastics film to be delivered inside said receptacle, enables it to be made into the form of a bag and put into place in the bottom of said receptacle, and makes this possible in a manner that is automatic and without manual intervention from an operator. The plastics film in the form of a sock that is packaged in said receptacle makes

it possible to provide bags whose bottoms and tops can be closed using a seal device of the type that creates a line of sealing, in particular a line of heat-sealing, or using any other sealing or cutting method that performs the same function.

The object of the present invention is also to provide a device for collecting and packaging waste, while avoiding any contact between said waste and portions of said device other than said plastics bin liner bag. Another object is to avoid as much as possible any propagation of smells, or indeed any possible emanations to the outside, coming from the inside of such a bag when partially filled with waste.

Another object of the present invention is to make collecting and packaging waste as efficient as possible by enabling said bags to be filled optimally.

Another object of the present invention is to provide a collection and packaging device which does not require any manual handling of the bag and which implies operation that is automated to the greatest possible extent.

To do this, the present invention provides a waste collector device of the above-described type, comprising a receptacle in which a plastics bin liner bag is placed, wherein the device:

- further comprises means for opening and closing said central orifice in the top portion of said receptacle through which it is possible to introduce waste into said bag, opening of said central orifice being triggered when an article such as some waste is detected over said central orifice, and said central orifice being kept closed between two occasions on which waste is introduced, said means for opening and closing said central orifice being situated above said drive means; and wherein:

- said drive means are suitable:

· for adopting a disengaged position in which they define an opening in the top margin of the bag enabling waste to be introduced therein without coming into contact with the open two margin of said covering;  
5 and

· for moving so as to pinch said plastics film covering coming from said compartment in the central region of said receptacle to enable said bag to be entrained, and where appropriate to be lowered down to  
10 the bottom of said receptacle.

More particularly, said drive means are constituted by first rollers situated in said receptacle beneath said storage compartment, which said storage compartment is located against the inside periphery of said receptacle  
15 in such a manner as to define a top central orifice of said receptacle through which said waste can be introduced into a said bag, and said first rollers are suitable for moving from two opposite sides of said receptacle until they pinch said plastics film covering  
20 coming from said compartment in the center region of said receptacle, and enable said bag to be driven and lowered to the bottom of said receptacle by rotating said first rollers.

Still more particularly, said first rollers are  
25 disposed in parallel, facing each other horizontally, and against or close to two opposite sides of said receptacle, and are suitable for being moved mechanically in horizontal translation in a direction perpendicular to their horizontal axes from a disengaged position enabling  
30 waste to be introduced into said bag through said central open orifice without coming into contact with the top margin of said bag, to a close-together position towards the center of said receptacle in which they pinch said covering and enable it to be driven, and where  
35 appropriate to be closed.

In accordance with the present invention, the opening into the covering is at a maximum while waste is

being introduced into the bag and the waste does not encounter any obstacle on being introduced into the bag. In addition, the waste is not subjected to any contact pressure prior to subsequent optional compacting that need not take place until after the top opening of the bag has been sealed once it has been filled with waste, as explained below.

More particularly, said seal and cutter means, preferably using heat-sealing and hot-cutting, enable the following steps to be performed:

- a) closing the open margin of said covering in the form of a sock coming from said storage compartment so as to make the bottom of a said bag prior to lowering it to the bottom of said receptacle;
- b) closing a bag that is completely or partially filled with waste;
- c) preferably, separating a said bag after it has been sealed, by cutting said plastics film covering above the zone corresponding to the sealed closure of the top margin of said full bag;
- d) preferably piercing part of the top margin of a said bag above said closure zone so as to constitute a handle in the full bag that is to be removed; and
- e) closing the bottom end of the margin of the covering coming from said compartment by heat-sealing above the zone that corresponds to said separation cut mentioned in step c), or where appropriate above said handle mentioned in step d).

Advantageously, said drive means and said seal and cutter means are situated in the top portion of said receptacle and are suitable for co-operating in such a manner as to be capable of sealing said plastics film so as to close a bottom of a said bag in said steps a) and e), prior to lowering said bag to the bottom of said receptacle, and where appropriate after or together with said closure of the top margin of a said full bag in step

b), and where appropriate after said cuts of steps c) and d).

In a preferred embodiment, said heat-seal and hot-cutter means are suitable for performing said steps a) to e) simultaneously, and preferably comprise two heat-seal plates placed facing each other in parallel and suitable for moving from two opposite sides of said receptacle into the center region of said receptacle, pinching said plastics film covering between said two heat-seal and hot-cutter plates.

More particularly, said heat-seal and hot-cutter plates are placed below said first drive rollers respectively, and are suitable for co-operating therewith so that when said two first drive rollers are rotated so as to enable said bag to be placed at the bottom of said receptacle, said heat-seal and hot-cutter plates are in a spaced-apart position so as to allow said bag to pass through and be lowered between them.

More particularly, said heat-seal and hot-cutter plates are disposed respectively beneath said first drive rollers and are secured thereto, said first rollers being mounted in flexible manner so that when they are in a position pinching a said covering, it is still possible to move said heat-seal and hot-cutter plates against each other in the center of said receptacle in order to perform said heat-sealing and said hot-cutting of said covering pinched between said two plates.

According to another advantageous characteristic of the present invention, the device includes compactor means suitable for applying pressure against the film constituting the bag once it is partially or completely filled with waste, said pressure being applied to the outside of the bag.

These compactor means come into action after the waste has been introduced into the bag and immediately prior to the bag opening being sealed, and they are thus

dissociated from or independent of the means for driving the covering.

The compactor device makes it possible to reduce the volume of the waste inside the bag, and thus to reduce the consumption of bag material and to increase the length of time a bag can be used, thereby reducing the number of bag changes. These compactor means are optional, and they could even be actuated manually, but preferably they are triggered automatically.

More particularly, said compactor means comprise pivotally-mounted compactor bars situated beneath said heat-seal and hot-cutter means and suitable for pivoting from a rest position in which said bars are disposed against respective opposite sides of said receptacle to a tilted position obtained by pivoting about respective pivot axes situated at their bottom ends which are secured against said respective opposite sides of said receptacle until the top ends of said bars reach the center region of said receptacle.

Preferably, said compactor means is actuated automatically using a photoelectric cell or a sensor, as soon as a said bag is more than half full, and preferably after each new introduction of waste into said bag, and then when said bag is completely full, said compactor means are maintained in the compacting position until after said heat-sealing and/or said hot-cutting for closing said full bag and, where appropriate, for separating it.

Advantageously, said compactor arms include flexible or semi-rigid strips tensioned across rigid frames so that when said compactor strips encounter said bag filled with said incompressible waste, said compactor strips deform, thereby avoiding tearing said plastics bag, and said pivoting of said compactor strip is interrupted on encountering resistance corresponding to a predetermined compacting pressure.



According to another advantageous characteristic of the present invention, the device includes means for opening and closing a central orifice in the top portion of said receptacle through which waste is introduced into said bag, said opening and closing means being controlled automatically by means of a photoelectric cell or a sensor so as to keep said receptacle closed between two occasions on which waste is introduced, and so as to cause said central orifice to open when an article such as waste is presented over the location corresponding to said central orifice.

Also advantageously, said opening and closing means comprising a moving strip wound between two second rollers disposed respectively against two opposite sides of said receptacle over said storage compartment, with movement of said strip being obtained by rotating said second rollers, said moving strip including an opening, preferably of substantially the same shape as said central orifice, so that when said opening coincides with said central orifice said receptacle is in an open position allowing waste to be introduced, and when a solid portion of said strip completely covers said top central orifice, said receptacle is in a closed position, thereby confining said waste inside said receptacle.

According to another advantageous characteristic of the present invention, said bag is put into place at the bottom of said receptacle inside a box, said box being secured to at least a bottom portion of one of the sides of said receptacle, and said box resting on slider means enabling a said bag to be removed by pulling said bottom portion of the side of the receptacle that is secured to said box.

According to another advantageous characteristic of the invention, the device of the invention is fitted with electronic means enabling the various steps listed below to be controlled and synchronized as a function of

information received from said photoelectric cells or sensors:

The present invention also provides a method of collecting waste using a device of the invention.

5 More particularly, the method of the invention for collecting waste is performed by implementing the following steps in succession:

1) sealing and cutting said covering to form the bottom of a said bag using said seal and cutter means  
10 (10<sub>1</sub>, 10<sub>2</sub>);

2) driving said bag inside said receptacle, preferably to the bottom of said receptacle, using said drive means (6<sub>1</sub>, 6<sub>2</sub>);

3) putting said drive means in a disengagement  
15 position in which they define an opening at the top margin of the bag, enabling waste to be introduced therein;

4) opening said central orifice (1<sub>2</sub>) using said closing and opening means (17, 18<sub>1</sub>, 18<sub>2</sub>) whenever waste is  
20 detected above said central orifice (1<sub>2</sub>);

5) inserting said waste through said open central orifice (1<sub>2</sub>), said waste being collected in the bottom of a said bag;

6) closing said central orifice (1<sub>2</sub>) using said means  
25 (17, 18<sub>1</sub>, 18<sub>2</sub>) for closing and opening central orifice (1<sub>2</sub>) immediately after said waste has been introduced through said central orifice (1<sub>2</sub>) opened in step 2);

7) where appropriate, compacting said bag using said compactor means (14<sub>1</sub>, 14<sub>2</sub>);

30 8) sealing and cutting the top margin of said bag, once full of waste, using said seal and cutter means (10<sub>1</sub>, 10<sub>2</sub>); and

9) where appropriate, removing said bag from said receptacle.

35 BRIEF DESCRIPTION OF THE DRAWINGS

Other characteristics and advantages of the present invention appear in the light of the following detailed

description made with reference to Figures 1 to 8, in which:

• Figure 1 is a perspective view of a waste collector device of the invention;

5       • Figure 2 is a mid-section view of a collector device of the invention showing a bag that is in place and half-filled with waste, the compactor arms being disengaged in a rest position;

10       • Figure 3 is a mid-section view of a collector device of the invention, the bag being two-thirds full and the compactor arms being put into compacting operation;

15       • Figure 4 is a mid-section view of a collector device of the invention in which the bag is full, with the compactor arms being in the compacting position and the heat-seal plates being in the heat-sealing position;

• Figures 5 and 6 show respective plates for heat-sealing and hot-cutting;

20       • Figure 7 shows the bottom portion of the device while a full bag is being removed, with the top portion of the device being shown with its lid raised; and

• Figure 8 is a view of means for opening and closing the central orifice in the top portion of said receptacle, through which waste is introduced.

25                   MORE DETAILED DESCRIPTION

The waste collector device comprises a receptacle 1 in which a plastics bin liner bag 2 is put into place. The device further comprises:

30       • drive means  $6_1$ ,  $6_2$  for driving a covering  $2_1$  for making a plastics bag 2 contained in a compartment 4 situated in the top portion of said receptacle 1, and said drive means  $6_1$ ,  $6_2$  serving to deliver said bag from said storage compartment 4 to a bottom  $1_1$  of said receptacle 1; and

35       • seal and cutter means  $10_1$ ,  $10_2$ , preferably operating by heat-sealing and hot-cutting, for sealing said covering leaving said compartment 4, and then

closing a said bag 2 once it has been filled with waste 20 and separating it from the remainder of said covering.

The waste collector device of the invention includes compactor means 14<sub>1</sub>, 14<sub>2</sub> for compacting the bag containing waste, and means 17, 18<sub>1</sub>-18<sub>4</sub> for closing and opening a central orifice through waste is introduced via the top portion of the collector device.

More precisely, the waste collector device of the present invention comprises a rigid receptacle 1 in the form of a rectangular parallelepiped having a plastics covering 2 placed therein for the purpose of making a bag.

The plastics bag 2 rests on the bottom 1<sub>1</sub> of the receptacle 1 in a bottom box 3 which serves to hold it and enables waste 20 to be contained in the event of the bag 2 being torn, and finally serves to remove the bag 2 in a manner explained below.

In its top portion, the receptacle 1 has a peripheral storage compartment 4 resting on a flat peripheral frame 5 constituting a support, said storage compartment 4 serving to store a plastics film 2<sub>1</sub>, in particular a polyethylene film, serving to make bags 2. The film 2<sub>1</sub> is stored in the form of a sock folded in said peripheral compartment 4, which compartment has a peripheral slot (not shown) enabling said film to be delivered and output in the form of a sock. It will be understood that the peripheral compartment 4 defines a central orifice 1<sub>2</sub> in the top portion of the receptacle 1 through which waste 20 is introduced into the bag 2 when it has been put into place down to the bottom 1<sub>1</sub> of the receptacle 1.

The receptacle 1 is fitted on the inside with means for putting the bag into place by unwinding the plastics film 2<sub>1</sub> from its compartment 4, said means being constituted by two of said first drive rollers 6<sub>1</sub>, 6<sub>2</sub> which are disposed and operate as follows.

Said first rollers  $6_1$ ,  $6_2$  are disposed facing each other along two opposite sides  $1_3$ ,  $1_4$  of said receptacle 1, i.e. they are parallel to each other. They can revolve about their own longitudinal axes which, thus constitute axes of rotation. They are suitable for being moved in translation in a transverse direction, i.e. in a direction perpendicular to their axes, i.e. along the direction of the other two lateral sides of said receptacle 1.

Said first rollers  $6_1$ ,  $6_2$  for driving the bag are mounted between two lateral support plates  $7_1$ ,  $7_2$ , themselves mounted under said support frame 5. Said lateral plates  $7_1$ ,  $7_2$  are placed against two opposite sides  $1_3$ ,  $1_4$  of said receptacle and are interconnected by transverse rods  $8_1$ ,  $8_2$  and  $16_1$ ,  $16_2$  disposed along the other two opposite sides 15, 16 of the receptacle so as to leave open said top central orifice  $1_2$  defined by said compartment 4. These guide rods are constituted by wormscrews along which carriages can be moved. Two carriages  $9_1$ ,  $9_2$  move along each of the first guide rods  $8_1$ ,  $8_2$ , each carriage being secured to an end of a respective one of said first drive rollers  $6_1$ ,  $6_2$ , thereby enabling said first rollers  $6_1$ ,  $6_2$  to be moved from the sides  $1_3$ ,  $1_4$  of the receptacle 1, towards the center of the receptacle in such a manner as to pinch the plastics film 4 constituting said bag. At least one of said drive rollers  $6_1$  is fitted with a first motor  $6_3$  fastened to one of its ends and enabling it to revolve. Said motor-driven first roller  $6_1$  causes the second drive roller  $6_2$  to rotate by means of two cog wheels secured to the shafts and at each end of each of said drive rollers  $6_1$ ,  $6_2$ , thereby constituting gearing when said two rollers  $6_1$ ,  $6_2$  are in contact. The shafts of the first rollers  $6_1$ ,  $6_2$  are mounted on the two lateral guide rods  $8_1$ ,  $8_2$  at their ends, and on the first carriages  $9_1$ ,  $9_2$  via return springs contained in the part  $6_4$  which serves to vary the spacing between said first rollers  $6_1$ ,  $6_2$  relative to each other

as a function of the thickness of the plastics film constituting the bag 2.

Said first rollers enable the sheath constituting the covering to be unwound, and thus lowered towards the bottom of the collector, but if they are caused to turn in the opposite direction, they can also cause the sheath to be raised, in order to save on sheath material if it is desired to optimize the length of sheath that is used relative to the waste it contains, i.e. so as to seal the sheath immediately about the waste. When the first rollers are spaced apart, they define a large bag opening of square section making it easier for waste to drop into the bag. The flexible mounting of said drive rollers  $6_1$ ,  $6_2$  also makes it possible to perform heat-sealing and hot-cutting of the plastics film for the purpose of sealing the end margin of the film forming a covering and thus forming the bottom of the bag before it is put into place, as explained below.

The film  $2_1$  initially leaves its compartment 4 in the form of a flexible open tubular covering. Said receptacle 1 is also fitted with heat-seal and hot-cutter means  $10_1$ ,  $10_2$  which enable the case to be sealed so as to constitute the bottom of a bag prior to being unwound down to the bottom of the receptacle 1. The heat-seal and hot-cutter means  $10_1$ ,  $10_2$  thus comprise two heat-seal and hot-cutter plates  $10_1$ ,  $10_2$ . These two heat-seal and hot-cutter plates  $10_1$ ,  $10_2$  are mounted beneath said first drive rollers  $6_1$ ,  $6_2$  and are secured thereto and to said first carriages  $9_1$ ,  $9_2$ . Said heat-seal and hot-cutter plates  $10_1$ ,  $10_2$  are thus moved by the same carriages  $9_1$ ,  $9_2$  in the transverse direction from the opposite sides  $1_3$ ,  $1_4$  of the receptacle 1 towards the center of the receptacle by moving along the two transverse guide rods  $8_1$ ,  $8_2$  constituted by wormscrews. Said heat-seal and hot-cutter plates  $10_1$ ,  $10_2$  are nevertheless offset a little back by about 1 centimeter (cm) relative to said drive rollers  $6_1$ ,  $6_2$  so that when said first drive rollers  $6_1$ ,  $6_2$  are in

contact against each other, said heat-seal and hot-cutter plates  $10_1$ ,  $10_2$  leave an empty space between each other, enabling the bag 2 to be unwound and to pass between said plates  $10_1$ ,  $10_2$  until it reaches the bottom  $1_1$  of the  
5 receptacle 1. Since said first drive rollers  $6_1$ ,  $6_2$  are mounted in flexible manner on return springs  $6_5$ , it is still possible to move said plates  $10_1$ ,  $10_2$  against said each other so as to perform heat-sealing and hot-cutting by continuing to move the carriages  $9_1$ ,  $9_2$  towards the  
10 center, with this being made possible by the way in which said drive rollers are mounted to allow them to move laterally.

The plastics film 2 is heat-sealed and hot-cut under the following circumstances:

15 1) Initially when the device is first used, i.e. the first time a bag is put into place. Before unwinding a full length of covering film to be installed at the bottom of the receptacle 1, the covering is closed by heat-sealing to constitute the bottom of the bag.

20 2) Thereafter, once the bag is full, the heat-seal and hot-cutter plates serve:

a) to heat-seal the top opening of the bag, thereby closing the bag;

25 b) to separate the bag closed in this way from the film situated above it which was previously in continuity with the bag prior to closure, separation being performed by hot-cutting;

30 c) to heat-seal the open covering as created in this way so as to make the bottom of the following bag that is to be put into place, i.e. lowered to the bottom  $1_1$  of the receptacle 1, after the preceding full bag 2 has been removed; and

35 d) to create a slot in the top portion of the margin of the full bag and situated above the heat-seal line, the slot being made by hot-cutting.

Above-mentioned operations a) to d) are performed simultaneously, given the structure of the heat-seal and hot-cutter plates 10<sub>1</sub> and 10<sub>2</sub>, as described below.

5 The first heat-seal and hot-cutter plate 10<sub>1</sub> has two longitudinal grooves running along its bottom and top sides, which grooves contain metal-clad resistance elements 11<sub>1</sub> and 11<sub>2</sub> serving to heat-seal the bottom of the top bag and the top margin of the bottom bag.

10 Beneath the top element 11<sub>1</sub>, there is placed a first heater wire 12<sub>1</sub> fixed to said first heat-seal plate 10<sub>1</sub> and tensioned between two fastening holes 13<sub>1</sub>, 13<sub>2</sub>. This first heater wire 12<sub>1</sub> co-operates with the second heat-seal plate 10<sub>1</sub> by being received in a first slot 10<sub>4</sub> of said second heat-seal and hot-cutter plate 10<sub>2</sub> when said  
15 heat-seal and hot-cutter plates 10<sub>1</sub> and 10<sub>2</sub> are pressed against each other so as to make contact. This cuts the film and separates the two bags by hot-cutting with the wire passing through the film 2 and through said second plate 10<sub>2</sub> so as to be received in the first slot 10<sub>4</sub> when  
20 said two plates 10<sub>1</sub> and 10<sub>2</sub> are put into contact. A second heater wire 12<sub>2</sub> is placed beneath the first heater wire 12<sub>1</sub>, extending over a shorter length than said first heater wire 12<sub>1</sub>. This second heater wire 12<sub>2</sub> co-operates with a second slot 10<sub>5</sub> of said second heat-seal plate 10<sub>2</sub>.  
25 Said second slot 10<sub>5</sub> is thus placed in register with the second heater wire 12<sub>2</sub> and operates in the same manner as the assembly comprised by the first heater wire 12<sub>1</sub> and the first slot 10<sub>4</sub>. Said second heater wire 12<sub>2</sub> co-operates with said second slot 10<sub>5</sub> to form a handle 2<sub>1</sub> in  
30 the top margin of the full bag 2 by hot-cutting, which bag is closed simultaneously by heat-sealing using said bottom second element 11<sub>2</sub>.

35 Naturally, the sealing and cutting of bags could be performed by methods other than heat-sealing and hot-cutting without thereby going beyond the ambit of the invention.



The waste collector device of the invention further comprises compactor means 14<sub>1</sub>, 14<sub>2</sub> and 15<sub>1</sub>, 15<sub>2</sub>, 16<sub>1</sub>, 16<sub>2</sub>, 16<sub>3</sub>, 16<sub>4</sub> for compacting the bag 1 once it has been filled with waste 20, completely or in part.

5       The compactor means comprise compactor arms 14<sub>1</sub>, 14<sub>2</sub> pivotally mounted against the inside walls of the opposite sides 1<sub>3</sub>, 1<sub>4</sub> of the receptacle 1. These compactor arms 14<sub>1</sub>, 14<sub>2</sub> pivot about their pivot axes 14<sub>3</sub>, 14<sub>4</sub> situated at the bottom ends of said compactor arms  
10 14<sub>1</sub>, 14<sub>2</sub>. Said bottom ends are secured against said opposite sides 1<sub>3</sub>, 1<sub>4</sub> respectively of said receptacle 1, so that by pivoting their top ends can tilt and move towards each other, pressing against the outsides of the walls of the bag 2 in its bottom portion. This compacts  
15 the waste 20 contained in the bag 2 while avoiding any contact with said waste.

In the rest position, prior to being put into operation, said compactor arms 14<sub>1</sub>, 14<sub>2</sub> are disposed substantially vertically against the sides of the  
20 receptacle 1, thus releasing the bag opening and enabling waste 20 to be introduced into said bags.

Said compactor arms 14<sub>1</sub>, 14<sub>2</sub> are pivoted in application by the following mechanism. The top ends of said compactors arms 14<sub>1</sub>, 14<sub>2</sub> can be moved towards the  
25 center of the receptacle 1 since they are connected via link arms 15<sub>1</sub>, 15<sub>2</sub> in the form of deformable parallelograms to second transverse guide rods 16<sub>1</sub>, 16<sub>2</sub> disposed transversely and serving to join together said lateral support plates 7<sub>1</sub>, 7<sub>2</sub>. It will be understood that  
30 said second transverse rods 16<sub>1</sub>, 16<sub>2</sub> are situated beneath said first transverse rods 8<sub>1</sub>, 8<sub>2</sub> and beneath said heat-seal and hot-cutter plates 10<sub>1</sub>, 10<sub>2</sub>. Said second transverse rods 16<sub>1</sub>, 16<sub>2</sub> are constituted by wormscrews supporting a second motor 16<sub>3</sub> enabling two carriages 16<sub>4</sub>,  
35 16<sub>5</sub> to be moved along each of the transverse rods 16<sub>1</sub>, 16<sub>2</sub>, each carriage being secured to one end of said link arms 15<sub>1</sub>, 15<sub>2</sub>. The pivoting of said compactor arms 14<sub>1</sub>,

14<sub>2</sub> takes place when said second carriages 16<sub>4</sub>, 16<sub>5</sub>, and thus said link arms 15<sub>1</sub>, 15<sub>2</sub>, are moved towards the center of the receptacle. The stationary bottom ends 14<sub>3</sub>, 14<sub>4</sub> of said compactor arms 14<sub>1</sub>, 14<sub>2</sub> are situated about halfway up  
5 the height of the bag 2.

When the bag 2 is two-thirds full, a first compacting operation is performed (Figure 3). Thereafter, if so desired, a new compacting operation is performed after each introduction of new waste into the  
10 inside of the bin liner bag 2. Finally, when the bin liner bag 2 is considered as being full, final compacting performed (Figure 4). During final compacting, the compactor arms 14<sub>1</sub>, 14<sub>2</sub> remain tilted in the compacting position so as to allow the bag to be closed by heat-  
15 sealing and to be hot-cut so as to be separated. Said compactor arms then return to the substantially vertical rest position against said opposite sides 1<sub>3</sub>, 1<sub>4</sub> of the receptacle 1 after heat-sealing and hot-cutting have been completed.

20 In order to avoid tearing the bag during compacting, the pivoting compactor arms are constituted by rigid frames, each of said frames supporting a flexible or semi-rigid strip (not shown) that is tensioned across the inside 14<sub>5</sub> of said frame. This embodiment enables  
25 compacting pressure to be exerted by said flexible or semi-rigid strip, thereby deforming the strip while pressure is being exerted and thus avoiding tearing the bag 2 if there is any incompressible waste 20 therein. In addition, the motor 16<sub>3</sub> driving pivoting of the  
30 compactor arms 14<sub>1</sub>, 14<sub>2</sub> is fitted with a device enabling it to be declutched in the event of pressure exceeding a certain given threshold, where said pressure threshold is adjustable depending on the nature of the waste to be collected.

35 The compactors arms 14<sub>1</sub>, 14<sub>2</sub> may naturally also be pivoted by a mechanism other than the systems of links

arms 15<sub>1</sub>, 15<sub>2</sub> guided by said second transverse rod constituted by wormscrews 16<sub>1</sub>, 16<sub>2</sub>.

The waste collector device of the invention is also fitted in its top portion with a sensor (not shown), in particular an ultrasound sensor enabling the level to  
5 which the bin liner bag has been filled to be sensed using a known technique for measuring distance, for example. Thus, when the distance between the waste 20 and the sensor has a value that corresponds to the bag  
10 being two-thirds full, said compactor arms 14<sub>1</sub>, 14<sub>2</sub> are automatically put into action. Similarly, after each introduction of waste 20 leading to a change in the height of the top of the waste, a new compacting operation is implemented automatically, if so desired.  
15 Finally, when the sensor detects that the bin liner bag 2 is completely full, the compactor arms 14<sub>1</sub>, 14<sub>2</sub> are maintained in the tilted compacting position, and the heat-seal and hot-cutter plates 10<sub>1</sub>, 10<sub>2</sub> are put into action by being moved automatically so as to come into  
20 contact against each other as mentioned above.

Nevertheless, it should be observed that it is possible for activation of the compactor arms 14<sub>1</sub>, 14<sub>2</sub> to be optional. Thus, in certain hospital applications waste should not be compacted. Under such circumstances,  
25 it suffices in the collector device of the invention to close the bag by heat-sealing once it is full, but without performing compacting.

After a full bag has been heat-sealed and closed, a new bag 2 as created in this way is unwound and put into  
30 place, likewise in automatic manner, once the full bag has been removed to the outside of the receptacle 1, as described below.

A full bin liner bag 2 is removed 3<sub>2</sub> as follows. The bottom box 3 is slidably mounted on supporting slideways  
35 so that it can be slide out from the front of the receptacle 1 like a drawer 3<sub>1</sub>.

If the bag is removed before it has been filled completely, opening the drawer 3<sub>1</sub> causes the motors for actuating the various elements of the collector device of the invention, such as compactor arms 14<sub>1</sub>, 14<sub>2</sub>, to be  
5 disconnected automatically. This removal 3<sub>2</sub> is performed manually, but it could also be motor-driven and under automatic control.

For reasons of hygiene, and in accordance with an advantageous characteristic of the invention, the waste  
10 collector device is fitted in its top portion with a device for automatically controlling opening and closing of the top portion of the receptacle 1, i.e. access to the opening of the bag 2 that is in place inside the receptacle 1. Between two occasions on which waste 20 is  
15 introduced into the collector device of the present invention, the top portion of the receptacle is closed, thus confining the waste in the receptacle, even if the bag 2 is not yet full and is therefore still open.

A device for opening and closing the top portion of  
20 the receptacle 1 is constituted by a moving strip 17 which moves between two second rollers 18<sub>1</sub>, 18<sub>2</sub> disposed respectively against two opposite sides of the receptacle 1 and above said compartment 4 for storing the folded film 2<sub>1</sub>. The moving strip 17 includes an opening of the  
25 same shape as the central opening 1<sub>2</sub> defined by the peripheral compartment 4 and said peripheral support frame 5 on which it rests. When the moving strip 17 moves between said second rollers 18<sub>1</sub>, 18<sub>2</sub>, said opening of said moving strip 17 coincides with said central  
30 opening 1<sub>2</sub> of the top portion of the receptacle 1, and said receptacle 1 is thus open and it is possible to introduce waste 20 into the bag 2. When the moving strip 17 is moved so that a solid portion of the strip 17 overlies said central opening of the receptacle 1, then  
35 the receptacle is closed and it is no longer possible to introduce waste 20 into the bag 2.

A third motor 18<sub>4</sub> rotates said second roller 18<sub>1</sub>, thereby also rotating said second roller 18<sub>2</sub> by means of a transverse connecting belt 18<sub>5</sub> interconnecting the shafts of said second rollers 18<sub>1</sub>, 18<sub>2</sub> via end pulley wheels 18<sub>3</sub>.  
5 Putting said motor 17<sub>1</sub> into operation causes the two rollers 18<sub>1</sub>, 18<sub>2</sub> to rotate, and thereby causes the strip 17 to move until the opening of the receptacle 1 is detected by a photoelectric cell or sensor (not shown) which detects the presence either of waste 20 being  
10 brought over the receptacle 1, or the presence of any other subject such as the hand of an operator, likewise presented over the closed opening of the receptacle 1. Thereafter closing of the receptacle 1 is likewise triggered automatically after it has been left open for a  
15 few seconds.

Without going beyond the ambit of the present invention, it is possible to provide a top system 17 for opening and closing the receptacle 1 that is different from the above, in particular that includes a tilting  
20 closure lid. Nevertheless, the system proposed in the invention with a horizontal moving strip presents the advantage of minimizing the amount of air that is moved, and thus of minimizing the exchange of air between the inside and the outside of the waste-filled bag. In a  
25 hospital application, this horizontal opening system avoids potential contamination problems.

Said second rollers 18<sub>1</sub>, 18<sub>2</sub>, which enable said moving strip to be moved for opening and closing the top of the receptacle 1, are housed in a hollow peripheral  
30 lid 19 situated above said peripheral compartment 4 and giving access thereto in order to install a new folded film 2<sub>1</sub> once the old film has been used up. One of the sides of said hollow lid 19 is mounted on a hinge 19<sub>1</sub> so as to enable it to be raised 19<sub>2</sub> by being tilted.

35 An important advantage of the invention is that all of the means used, whether the means for unwinding the bag, the means for heat-sealing, or the means for

compacting, all act from the outside of the plastics film covering constituting the walls of the bag 2, and thus without coming into contact with said waste 20; this also guarantees hygiene. The waste thus always falls directly  
5 into the bag, without ever coming into contact with the various means implemented.

The collector device of the invention includes an electronics card (22) for controlling the various motors that serve to rotate said first rollers 6<sub>1</sub>, 6<sub>2</sub>, said  
10 second rollers 18<sub>1</sub>, 18<sub>2</sub>, or to move said first rollers 6<sub>1</sub>, 6<sub>2</sub> and said heat-seal plates 10<sub>1</sub>, 10<sub>2</sub>, and/or to pivot said compactor arms 14<sub>1</sub>, 14<sub>2</sub>, as a function of information received from said sensor.

Furthermore, the electronics card also controls  
15 disconnection of the various heat-seal means and compactor means, etc., during optional early removal 3<sub>2</sub> of a bag from said receptacle 1.

The electronics card thus manages both the safety and the operating functions of the waste collector device  
20 of the invention.

It should be observed that the sensor for monitoring opening of the receptacle 1 also serves to ensure that said opening is not obstructed by poorly-introduced waste.

25 Finally, it should be observed that the device can be programmed so as to make unitary coverings for each introduction of waste, whenever so required, i.e. without waiting for the bag to be completely filled prior to closing the bag by heat-sealing and enabling it to be  
30 removed. More generally, bulk collection is performed with full bags being removed.

A waste collector and packaging device of the invention can advantageously be used as a waste bin, optionally integrated in a kitchen or a bathroom, in a  
35 household application, or indeed in a collective application such as in a hospital or in a canteen. Finally, the collector and packaging device of the

invention can be adapted to contain a plurality of receptacles side by side or a plurality of bags 2 side by side in the same receptacle 1 so as to enable waste to be sorted.